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Experimental Work in the Improvement of Useful Plants.

THERE is abundant evidence that the work of the experiment stations is growing more practical every year. By this we do not mean that it is growing less scientific, for really, unless all study and tests are conducted in the true scientific spirit, they will have little value. What we are glad to say is that the knowledge which is gained at the stations concerning the diseases of plants, the life and habits of insects, the chemistry of soils, of milk and of butter, is speedily adapted to practical use in the farms and gardens of the country, so that spraying compounds and spraying machinery, the Babcock tester and other appliances for securing approved products in agriculture and horticulture are becoming just as familiar to cultivators and dairymen as plows and ordinary implements of husbandry were ten years ago. No doubt, there is much misdirected effort in these stations, but, on the whole, they are developing on hopeful lines, and the people who are profited by them are coming every day into closer connection with them and are learning where to turn for satisfactory answers to many of the puzzles and troubles which confront them in their daily occupation.

What we should like to see is increased attention in some of the stations to experiments for the improvement of quality in varieties of useful plants. The breeding of improved plants bears the same relation to horticulture that the breeding of improved stock does to animal husbandry. When we remember that all the valuable varieties of orchard fruits have been produced from comparatively few species whose fruits were originally scarcely edible, and that exquisite flavor, various times of ripening, differences in form, color and keeping quality and other points of excellence have all been gained by selection, hybridizing and cross-fertilization, it hardly becomes us to say that the very highest results have yet been attained. Of course, there has been much thought and care bestowed on all these matters during the long generations which it has taken to develop these fruits from their primitive forms, and yet there has been very little systematic study of hybridizing and cross-breeding.

Any skillful breeder of horses will undertake in a few generations to furnish an animal of a given size and conformation, an animal which is just suited for a given kind of work. Very few plant-breeders would care to promise the production of a raspberry of a given firmness or flavor, or a rose of a given form or color, and yet there must be certain laws which can be, to some extent, relied upon in the rearing of different strains of plants just as there are in the rearing of different strains of animals. In the northwest there has been very much work in the line of securing orchard fruits of greater hardiness, and experimenters there are learning what varieties can be most hopefully used as parents. We are learning, too, what blood can be trusted to produce a hardy Grape-vine, but there is much more to be discovered, and to make these discoveries requires systematic effort through a long series of years. It is a work which does not command immediate pecuniary reward; it is too slow and too costly and too uncertain. Besides this, it is a work which requires scientific knowledge and trained skill of the highest sort, and therefore it cannot be expected of ordinary cultivators.

What seems to be needed is a new class of specialists who shall devote themselves entirely to this work of plant-improvement. Desultory and unsystematic experiment will not answer. The subject must be pursued in a thoroughly scientific way. This is why the matter is commended to experiment stations. In these stations there are horticulturists and botanists and chemists; why not have some one to devote his labors exclusively to the improvement of plants? This work is tedious and most uncertain at the beginning. All the processes, from the pollenizing of the flowers to the gathering of the seed, require the utmost care. Many of the fertilized flowers will fail to set seed, and then the fruits which contain the coveted seeds must be carefully watched throughout the season. It requires another year, sometimes many years, to produce plants from these, and then the most careful investigation of their characters must be made. Sometimes the material produced will be too scanty to work with, and again it will be so abundant and will open out into so many directions that a man with anything else on his hands will despair of exploring them all. No one can have too large a knowledge of horticultural varieties for this work; no one can have too profound a knowledge of plant-growth; no one can have too many appliances at his command to make the work efficient. It certainly is worthy of the highest skill and the closest application, and it promises to be of sufficient value to justify the attention of the men who are paid to make experiments for the benefit of the agriculture and horticulture of the country. Few private individuals have the means, the time, the appliances and the skill which are necessary to prosecute this work, and the stations were organized for the express purpose of undertaking research which it is beyond the power of private individuals to conduct.

These thoughts have been suggested by an account of the labors of Mr. Luther Burbank in California, who is said to be testing 600,000 hybrid and cross-bred seedling Raspberry-plants, more than half a million hybrid seedling Lilies, and to be making experiments with many other genera on an equally generous scale. We know nothing, by personal examination, of the novelties which Mr. Burbank offers of the Mammoth Japan Chestnut, for instance, which has been selected from more than 10,000 seedlings, a tree bearing glossy nuts as large as the Japanese chestnut, and as sweet as the American chestnut; or of a Walnut, a hybrid between Juglans nigra and Juglans Californica, with nuts of the largest size and in quality much superior to those of either parent. What we do know is that Mr. Burbank has been experimenting in this line for many years, that the Potato which he originated, and which has gone by his name, has been a variety of established merit for the past sixteen years, and that he is known as the originator of several Plums

and other fruits of excellent quality. The extent of his work only shows how much must be done before one good variety can be brought forth, and how ardent must be the zeal which sustains any individual through long years of labor, expense and uncertainty. It can hardly be expected that many other persons will enter this field with so much enthusiasm and determination and ability, and therefore it is that we venture to hope that the experiment stations will take up this work. They have the continuous life needed for investigations which must be carried on through many years. They ought to command the trained skill. They are unbiased by any commercial considerations and can afford to be absolutely sincere. They have the Government of the United States and the people of the United States as supporters and patrons.

We have already alluded to the passage of an act by the Legislature of Pennsylvania creating a Forest Commission, whose first duty will be to make a thorough survey of that state. Inasmuch as the commission is to frame a forestry bill based on the data secured by the survey, the success or failure of the act will depend largely on the quality of the men who are named as members of this commission. We are glad to know that Governor Pattison has appointed as botanist of the commission Professor J. T. Rothrock, late of the University of Pennsylvania, a man whose acquirements are universally recognized, and Colonel A. Harvey Tyson, of Reading, as the engineer. The task of framing a bill which will deal firmly with existing abuses, and yet be temperate enough to enlist the support of all the various classes of people who have some interest in the forests, so that the Legislature can be assured that they are representing the popular will when they make it a law, is a delicate one, and it is, therefore, gratifying to know that the movement has been committed to capable hands at the outset.

On several occasions we have published articles to show that the soil and climate of North Carolina were adapted to the cultivation of Dutch bulbs for market. In the present number will be found some notes on the behavior of these bulbs in Texas, from an esteemed correspondent and a most careful observer. The fact that Hyacinths, which were cross-bred seedlings from the primitive type, Hyacinthus orientalis, became naturalized and showed a marked improvement over the original plants, is certainly interesting. The superstition that these bulbs can only be raised in Holland was long ago exploded, and it now seems probable that the time is not far distant when American gardens can be supplied with home-grown bulbs of good quality and at reasonable prices.

Hardy Azaleas at Knap Hill.

No class of hardy shrubs gives the same variety of color as the hardy Azalea, and no one has done more to bring the race to its present perfection than Mr. Waterer, whose nursery at Knap Hill is fragrant with the spicy odor of the masses of flowers. The race originated by intercrossing the North American species, as A. calendulacea and A. nudiflora with A. Pontica, and since Mr. Waterer first interested himself in the shrubs great progress has been made, as may be seen by the large collection in his nursery. One may get some idea of their beauty from quite small plants, but there are many noble specimens, spreading bushes smothered in bloom and just displaying the tender green leafage for contrast.

One may ask, What is the special charm of the newer acquisitions? It is difficult to answer the question, except by recommending personal observation, comparing the later varieties with those of even not many years ago. All hardy Azaleas are beautiful, capable of imparting delightful color to the garden, but all are not of the same high quality as regards the individual flowers. A visit to Knap Hill in Azalea time is well repaid, as such shrubs do not appear to full advantage in pots at the exhibition. The newer varieties are distinguished by flowers of great breadth, the upper segments well thrown back, thus displaying the color, and they compose large, finely formed trusses, quite different from the Honeysuckle-like effect of the older kinds. Each year we see distinct and splendid advances, and the variety Mrs. Anthony Waterer, certificated at the Temple show of the Royal Horticultural Society last year, possesses the good qualities of the finest types. We noticed it in bloom this season, and it is a lovely flower, broad, robust in expression, of the purest white, except for a suffusion of yellow on the upper petals, and held well up, while the truss is bold. When in full beauty the shrub is a mass of white, exhaling a sweet fragrance. The newer seedlings are of the same light character, and the resplendent tints that tell well in the landscape each year get more diversified.

These results are attained by hybridizing the best kinds, but it is slow work, and about four years elapse before the seedlings flower, then, perhaps, to be destroyed, as falling short of the high ideal in the mind's eye of the raiser. The best varieties are marked, and in time layered for the production of stock. The color most largely represented is yellow, and Nancy Waterer is a superb flower, broad and richly colored; but one may enumerate many shades of orange, primrose and yellow that create a gay show of color. In a special place there are many choice seedlings, and it is these that augur well for the future of the hardy Azalea. They are a veritable surprise, the flowers distinct in color, well shaped, and the truss of bold size. Those varieties that bear flowers with blotches on the upper part are very striking, standing well out from the other less decided types. The Knap Hill collection is getting rich in scarlets, and some of the more recent acquisitions are superb flowers—glowing crimson of quite a self-shade, orange-red, and many allied tints. We picked out several that, if in the woodland, would appear as a flame of fire against the tender green leafage—a brilliant mass of color. Although a name is given to some especially choice acquisition, as Mrs. Anthony Waterer, a wholesale system of giving names is wisely not followed. The reason is obvious, as it would mean a mere string of titles, every variety almost being worth some distinctive mark. The Azaleas are classed simply as "Knap Hill," a sufficient guarantee of their beauty.

The visitor to Knap Hill in the late days of May or early June will note the great strides that are being made with the double Azaleas, not semi-double, but true double flowers. There are many shades of color, but the double rose and pink are delightful. The flowers are borne in a handsome head, and individually of exquisite shape, perfectly double, and tender in color. Such flowers should be in demand for cutting, and nothing in its way is more enjoyable than the more delicately tinted varieties, white, pink, and so forth, which last well in water, while they have a sweet, yet not too powerful, fragrance. Mr. Waterer is also raising a race of later-flowering hybrids, and we may in time get Azaleas over a much longer season than early summer. Many woodland and wild spots would be made more beautiful by a judicious selection of varieties that provide a splendid series of colors from carmine to the purest white, orange-scarlet in particular, as brilliant as anything one can get among hardy shrubs. Where the Rhododendron is at home there also is the Azalea, and the bold group of plants in the wilderness at Kew shows that they are not only perfectly hardy, but the flowers remain untouched by late frosts when they receive reasonable shelter. Protection from keen winds and some amount of shade are desirable, while if the soil is not peat, that composed of fibry loam mixed with leaf-mold, or loam alone, will prove sufficient.

The Knap Hill Azaleas are a perfect blaze of color at this season of the year, and there is also a feast of color in the autumn season, when the foliage turns to many shades of color—bright red, brown, chocolate and allied shades, sometimes mixed and sometimes self, but always a pleasure to see. The dying leaves are as beautiful as the flowers, lighting up the garden with color in the late days of September and early October.—*The London Garden.*

Dutch Bulbs in Texas.

In the cultivation of imported Hyacinths in this state the general experience of horticulturists is that they give satisfaction the first year after they are planted, but then dwindle into smaller bulbs, and finally disappear. Tulips often do no better than Hyacinths when the bulbs are planted in sand or in the heavy, black, waxy soil of the prairies. I have never tried to grow any bulbs in such soils, the soil on my place being a rich prairie loam of chocolate color from one to three feet deep, on a foundation of limestone. The descendants of a fine collection of Hyacinths received direct from Belgium thirty years ago can be seen here to-day. These are doing splendidly, and produce flowers at least as good as those of their Dutch ancestors. My experience has been that im-

ported bulbs do well the first year; the second, some disappear, some divide into many smaller bulbs, and others keep their size; the third year there is a general improvement, and after that they may be considered acclimatized. The blue sorts are always the hardiest, and the double red the most delicate. Some kinds have invariably done well from the beginning. Among these may be cited Baron von Thyul, both the blue and white varieties; Anna Maria, Goethe, Charles Dickens, Penelope. The White Roman multiply with wonderful rapidity; the red-bulb variety is very hardy, and the flowers stand almost any cold that may occur in our winter; they are frequently in bloom in December.

To show how our climate and the soil on my place are suited to Hyacinths I mention the fact that a long time ago I had a row of the primitive type of Hyacinth (Hyacinthus orientalis) with racemes of sparse blue flowers, near which were a few of the pink variety. They both bore seeds, some of which were washed into a hedge of Osage-orange a hundred yards distant, where, to my surprise and gratification, I discovered, several years afterward, a large number of Hyacinths in bloom, all showing remarkable improvements over their progenitors. The scape was taller, the truss more dense, the individual flower of a better substance and size, the colors ranging from very dark purple to the palest blue, and from bright red to pinkish white. Two plants had double flowers, one pink and the other blush. It was remarkable that no specimen was like either of the originators, every one being an improvement.

In cultivating I manure heavily with well-rotted cow-manure, spade thoroughly, plant the bulbs in October six inches apart and about six inches deep, and lift the bulbs as soon as they are dry. I have sometimes left them two years without disturbing them, but I think it is better to lift them every year. Tulips I have not grown as extensively as Hyacinths, but they seem to do equally well.

The genus Narcissus seems to be at home in Texas. The hardiest of all is the large-flowering Jonquil, Narcissus odorus. This grows freely and invariably bears an immense crop of flowers that ordinarily appear in February, and which stand well through any late frost. The true Jonquil (N. Jonquilla) blooms a little later and is equally satisfactory. Then comes the whole family of Polyanthus; unfortunately, these flowers are somewhat tender and are sometimes cut down by late frost, making it advisable to use cold frames for them. Two years ago I received a collection of the principal varieties of Narcissus, and most of them have behaved extremely well. Emperor, Ard Righ, Sir Watkins, Trumpet Major, Giant Princeps, Stella and several others have bloomed beautifully, and I have no doubt of their continued success here.

As a rule all the early-blooming varieties give entire satisfaction here; the late varieties, as N. poeticus and N. biflorus, do not bloom as well, and should be planted in the shade. N. poeticus ornatus is much more desirable than the old type. What I have said about the cultivation of Hyacinths applies to the cultivation of Narcissus, with the exception that Narcissus may be left undisturbed for several years. They multiply very fast, and have, with me, shown no signs of disease.

The common Snowflake (Leucojum vernum) is doing as well as the Narcissi, under the same treatment.

The Snowdrop and several bulbous Irises that I have tried have succeeded only moderately, and Crocuses have proved a flat failure; they are likely to bloom the first year, but after that no more is seen of them. Other bulbous plants, as the Musk, the Grape and Feather Hyacinths, are perfectly naturalized on my place. So also is Scilla nutans. Another plant that I cannot praise too much is Triteleia uniflora. It gives an abundance of flowers early in the spring and multiplies so fast that it is nearly impossible to eradicate it when it is once planted. As a pot-plant it is unsurpassed; four or five bulbs planted in a six-inch pot will give an abundance of flowers during the winter if it is kept in a warm place. The only defect of that plant is the garlic odor it emits if it is bruised.

Dallas, Texas. *Julien Reverchon.*

Notes from West Virginia.

THE first Roses to appear here were the Cinnamon Roses and the Scotch Briers, close after which bloomed Rosa rugosa, which one can hardly praise too highly for its effectiveness as a shrub all the season through. They were not injured in the least by the severe cold of the winter which cut down all our tender varieties to the ground. Madame George Bruant, which has Rugosa blood in it, escaped unharmed, and it has been covered with large and fragrant blossoms. Late in May, Elæagnus umbellatus, which we long mistook for E. longipes, began to open its small very fragrant flowers, which were freely borne along the branches. These are cream-white when they first appear, fading to dull yellow before they fall. I was very much put out with this shrub because it did not behave as E. longipes was said to do in regard to its bearing of fruit, but, nevertheless, I find it a most interesting plant, and its fruit, which ripens in October after the frosts and hangs upon the trees as late as Christmas, is to me delightful.

Pæonies still continue to dazzle our eyes with their bright colors. I had been told that these plants resented any disturbance of their roots, and that they would not flower the year they were removed. I am glad to be able to make a denial of this statement. I prepared a bed to hold a dozen varieties in April, and bought the plants for it in Washington; they came with splendid roots, and they have all flowered well this year.

No one who has a place for a small tree or a large shrub should be without the White Fringe-tree, which went out of bloom here a week ago. When in flower it seems to be covered with a bridal-veil of the airiest texture, so exquisite is the delicacy of the white blossoms. Other shrubs are coming into bloom so fast that there is no room for a catalogue of all the Mock Oranges, Deutzias, Dogwoods, Corchoruses and Lilacs, but I must say a word for Syringa villosa, which blooms after the garden forms of S. vulgaris are all gone. The odor of its flowers is not pleasant to some persons, and they would be more striking if the lilac color was not so pale, and yet this strong-growing shrub, with a thyrsus at the end of every branchlet, makes a very brave show, and ought to find its way very generally into gardens.

Rose Brake, W. Va. *Danske Dandridge.*

Notes on Mexican Travel.—VI.

IN MICHOACAN.

TO me Michoacan is one of the most interesting and beautiful of all the Mexican states. It is a region of lovely lakes, of rich tilled valleys and of heavily timbered mountains. From the valley of the Lerma, in the heart of the continent, it spreads over the southern Cordilleras and extends down to the Pacific coast. No tour of Mexico is complete without a trip into Michoacan by a branch of the Mexican National. Leaving the main line at Acambaro, on the alluvial banks of the Lerma, we pass for a dozen miles over undulating hills devoted to grazing. Here and there among the grassy glades are outcrops of rugged rock covered with shrubby growths. Scattered over the glades are small trees of Acacia pennatula, with low flat heads, which in May are yellow with fragrant flowers. More noticeable than this is a Morning-glory-tree (Ipomœa muricata). It has smooth yellowish bark, and all through the winter months puts out large white flowers.

From these hills we descend into the basin of Lake Cuitzeo, passing at the foot of the hills a typical hacienda, the grand residence of the proprietor, with accompanying chapel and granaries, being surrounded by a village of humble houses, the homes of the hacienda laborers, each in its little walled-in garden-plat amid fruits, vegetables and flowers. Cuitzeo is a saline lake without outlet, and we come to it over broad salt-marshes, the soil and even the salt-grass partially covering it being whitened. We observe with curious interest the primitive salt-works here. The soil is leached in V-shaped receptacles, and the brine is evaporated in shallow troughs hewn from pine-logs, which are placed in the sun and covered on the approach of rain with rifts of pine. We are told the story of a ruin near by. Years ago a Frenchman set out to make salt here by improved methods. He began putting up a large stone building for his furnaces. The natives worked for him till it was near completion; then, fearing that their occupation would be gone if he was allowed to go on, they murdered him, and returned to their leaches and troughs. His tall chimney-shaft of white rock still stands as his monument. Let it, also, tell how the ignorant peon class of the country is a dead-weight to hinder its progress.

For fifteen miles our course runs along the shore of this lake, now over salt-marshes, now hugging rocky bluffs. From whatever point we look out over it, Cuitzeo is a beautiful expanse of blue water, indented by wooded headlands and dotted by wooded or grassy islands. We pass warm springs on its shore, broad limpid pools, over which Indian women bend at their washing, while tawny-skinned children tumble and splash among the Lily-pads. A mile south of the station of Querendaro, in a boggy meadow beside the track, are numerous springs so hot that we can see columns of steam arising from them at midday in August. We can hardly touch a finger to the water, for they boil up like a pot, coming from black depths in the soil, and flowing away toward the lake. On my last visit to these springs I found a steer fallen into one of them and boiled whole there.

Under ledges on this shore is the habitat of the beautiful malvaceous shrub, Malvaviscus acerifolius, which I have noticed in the central plaza of Mexico. Its flowers are creamy white, and are three inches long and wide. Here the plant grows in large clumps fifteen feet high. The uncleared belt between the shore and the hills is occupied by Pepper-trees, Schinus molle, venerable Mesquites, and, larger than either of these, grotesque forms of Ehretia Mexicana, Watson.

The friendly agent at Querendaro told me a curious thing about Lake Cuitzeo, that there are but two or three places in all its extent where its depth exceeds a few feet. We see Indian fishermen wading through it at a long distance from shore and drawing after them by a line their canoes, into which they turn from circular nets, six feet broad, shining fishes but two or three inches long. After being dried entire in the sun and packed in great sacks of matting, this fish is shipped by the car-load to the markets of the large cities. Another occupation of these Indians is the gathering of reeds and flags from the water, drying them in the sun and weaving mats from them. These are the mats which, spread on the bare earth or harder tiles, form the only beds of one-half the Mexican population.

From Lake Cuitzeo, winding over hill-side grades, gliding through secluded valleys, among corn-fields or by slow streams, in whose waters huge Cypress-trees stand, passing an occasional grand hacienda, cool with its white walls and shady colonnades, we come to Morelia, the capital of the state. Every one is charmed with Morelia. It occupies a commanding situation, is a compactly built city and shows many imposing structures and several magnificent parks and gardens. One garden, founded by a late governor, is filled, not with exotics, but with the most interesting plants native to the state. The idea is unique, and perfect success having been attained in the management of the plants, the garden presents a beautiful appearance and offers a delightful study.

We leave Morelia for Patzcuaro, at the end of the line, soon entering a volcanic region. We pass two or three stations, which are shipping-points for the lumber brought down from neighboring mountains. There is both sawed lumber and railroad-ties of pine and oak, which have been hewn by Indians in the forests. As we near the sharp Pine-clad peaks standing around Patzcuaro there comes into view on our right another lake almost as large, and even more charming than Cuitzeo. Its outline is irregular in the extreme, and island hills arise from its surface. Fertile cultivated slopes, with numerous villages upon them, come down to its shores. Beyond the cleared fields are heavy forests of Oak and Pine reaching to the mountain-summits which surround it. Lake Patzcuaro lies nearly 7,000 feet above sea-level, and the mountain-tops which meet the sky-line beyond it are the continental divide. On the other side the descent to the hot lands is rapid; a ride of forty miles would bring us into Cane-fields, Banana-plantations and Orange-groves. Over this southern rim of the table-lands the precipitation of rain is excessive. To this fact is due the fine forest-growths abounding here. Although this lake has no visible outlet, its waters are fresh. This region has been inhabited from prehistoric times by the Tarascan tribe of Indians, whom the Aztecs never conquered. On the waters of the lake still swarm their log canoes, as they fish or take to market the product of their toil. They live in villages chiefly, and are an industrious and thrifty people.

By the lake is a steam saw-mill, to which the logs are brought in rafts and barges from the farther end, above which are the more extensive forests. There the Montezuma Pine grows to large size, and Quercus reticulata, the Mexican White Oak, attains the fullest development ever seen by me, a trunk diameter of three feet and a height of eighty. It is the timber of this species which is most prized as being the most lasting for railroad-ties and the best adapted to wheelwright work.

The railroad ends by the lake, and Patzcuaro station is the shipping-point for a broad region lying to the south. Hither come daily long trains of pack-mules, laden with sugar, rice, coffee and fruits. The town is situated among hills a mile or more above the station. It is the quaintest and strangest town as yet seen by me in Mexico. Great Ashes and Willows make dim its squares. Grass grows between the rough stones which pave its streets. Its red-tiled roofs are covered with moss and lichen. Ferns root among the chiseled ornaments of house and church walls. Rows of weeds stand on the top of the adobe-walls enclosing garden and court. Its buildings tell of age and decadence. In its streets there is seldom heard the sound of a wagon-wheel. The dons ride out in silver-mounted saddles, with fine trappings. My lady makes her calls on foot, and goes down to the station in her saddle or her sedan-chair.

The Patzcuaro country is a volcanic region. Its soil shows the red lava stain. In the top of every hill and mountain we find one or more craters, deep, sheltered preserves for plants, wild animals and birds. Just back of the town a tract of lava beds begins, which reaches fifty miles or more to the south, to the volcano of Jorullo. It is the wildest sort of a district, and is almost impassable, even on foot, rocky knobs and ridges alternating with rock-bound hollows and pits in utter confusion. Here is a field worthy of any botanist, where strange plants lurk in nooks to surprise him, and where old Oaks are hung with Ferns and Orchids galore.

But how can I attempt to tell of all the plants gathered, or new species brought to light in the Patzcuaro country on visits made during three seasons; or how put in words all the memories that crowd upon me as I write—memories of delights experienced in those fields through warm, golden autumn days, after the rainy season had passed, and when the mountain-sides were gay with flowers and thronged with humming-birds quite down to the end of the year?

Charlotte, Vt. *C. G. Pringle.*

New or Little-known Plants.

Syringa pubescens.

A FIGURE of a flowering branch of Syringa pubescens appeared in the first volume of this journal (page 415). This is a north China species, with remarkably long-tubed flowers, and has proved such a valuable plant in our northern climate that another illustration, showing the habit of the shrub and its appearance when in bloom, is published on page 266 of the present issue.

Few shrubs produce such a mass of flowers as this Chinese Lilac; the habit of the plant is excellent; the leaves are small, of a good color, and are not injured by mildew or other diseases. It flowers profusely every year; the flowers, which are rose-color on first opening, become nearly white before fading and surpass those of any other Lilac in the delicacy of their delightful fragrance. Of its hardiness there can be no question; and its moderate size, as Syringa pubescens probably will not grow here more than six or eight feet high, makes it a good plant for small gardens. It flowers with the early-flowering varieties of Syringa vulgaris, immediately after Syringa oblata, which is another north China species, and the earliest of all Lilacs to bloom.

Syringa pubescens, which was brought into our gardens through the Arnold Arboretum, where it was raised from seed sent from Pekin, is certainly one of the best, if not the best, hardy shrub introduced into cultivation during the last twenty years.

Our illustration is from a photograph made by Mr. James M. Codman, in a garden in Brookline, Massachusetts.

Azaleo-dendrons.

IN a recent issue of the *Gardeners' Chronicle* there is a figure of a representative of a new race of hybrids which are not only exceedingly interesting, but promise to become valuable garden-plants. They have been produced by crossing Rhododendron (Azalea) Sinensis or mollis and one of the true broad-leaved evergreen garden Rhododendrons of Catawbiense blood. To this new race the name of Azaleo-dendron has been given. Half a dozen of these hybrids, raised in Belgium by Mr. Van der Meluen, of Ghent, are now in commerce.

Azaleo-dendron Komte de Kerchove, the variety figured by our contemporary, is described as "a shrub with the habit of Azalea mollis, the leaves persistent, or nearly so, intermediate in texture and form between those of the parents; flowers produced with the leaves, palish yellow, flushed with rose, and arranged in a loose terminal many-flowered inflorescence. The central portion of the medium lobe of the corolla, and, to a slight extent, that of the lateral ones, is marked with numerous densely arranged spots of a reddish chocolate-color, gradually passing into olive and pale green." Azalea Sinensis was used as the pollen parent in producing this race with a number of Rhododendrons, such as Prince Camille de Rohan and Leopard, and, perhaps, John Waterer and Bylsianum.

The production of hybrids between Azaleas and Rhododendrons is not new. In 1837, Dean Herbert, in his history of the Amaryllis family, describes on page 356 a Rhododendron azaleoides obtained by the accidental fertilization of an Azalea by the pollen of Rhododendron Ponticum. According to our contemporary, a cross raised by Mr. Smith, a nurseryman of Norbiton, from Rhododendron Ponticum, fertilized with the pollen of Azalea Sinensis, was exhibited at Ghent as long ago as 1839. Seedlings of this cross were once well known in England as the Norbiton Hybrids, and one of them was figured in *Paxton's Magazine of Botany* in 1842. This was an evergreen shrub with wrinkled leaves and with large clusters of terminal flowers shaded and spotted with light brown. From time to time other hybrids have appeared in European gardens raised by crossing Rhododendrons and Azaleas. Such hybrids, apart from their ornamental value, which is likely to be considerable if a race of hardy evergreen yellow-flowered Rhododendrons can be obtained, are interesting as showing that the view of modern systematic botanists who unite Azalea and Rhododendron in one genus is the correct one.

Cultural Department.

Caraganas or Siberian Pea-trees.

THIS group of shrubs, belonging to the Leguminosæ or Pea family, possesses a good deal of interest to every one who cultivates woody plants. The several species in cultivation are so varied in form and habit that they present very different aspects, and, to the casual observer, do not always show their close relationships. Most of those known are perfectly hardy in this latitude, and will endure the winters without injury in localities where the cold is much greater. Indeed, they should be hardy, for they are largely natives of Russia and Siberia, the hardy species extending southward through such countries as Turkestan and to the mountains which form the northern boundaries of India. All have small pinnate leaves, and the characteristic color of the flowers is yellow, or in some species more or less reddish. Although some of them have been long in cultivation in the Old World, they are comparatively rare in American gardens. All are very easily propagated by seeds or grafts, and are also sometimes increased by layers or root-cuttings. They will grow in almost any garden soil and will thrive in many poor sandy tracts.

The largest, most robust, and in many respects the most desirable species is Caragana arborescens. This will bloom well when only two or three feet high, but with room to develop it will assume a small tree-like form and attain a height from ten to twenty feet. Sometimes several of its smooth-barked, reddish brown stems grow from the base instead of a single trunk. There are usually six or seven pair of small, oval or obovate, mucronate, light green leaflets to each leaf on the strong new growths, but fewer leaflets on the flowering branches. The bright yellow Laburnum-like blossoms are produced in abundance on individual short stalks, and in this latitude they usually begin to open about the middle of May. While they suggest Laburnum-blossoms, they lack the showiness and grace of those flowers, which are aggregated on long leafless racemes. This Caragana, however, is quite out of bloom before Laburnum-blossoms appear, and as yellow-flowering shrubs at this season are not common, it has a peculiar value. Moreover, it will grow in climates and situations too severe for the Laburnum, which is not such a strong and enduring plant. The small fruits, resembling pea-pods, mature about the middle of July. Soon afterward, on dry warm days, the pods open with a sharp audible snap, and the seeds are often scattered for many feet around. With slight encouragement they soon germinate and form young plants the same season. There is a weeping or pendulous form of this species, which is odd-looking when grafted on a tall stem.

We have growing in the Arboretum several so-called varieties of C. arborescens, but they are probably forms of another species known as Caragana Altagana. This is a smaller, more slender shrub, with more numerous but much smaller leaflets, usually not over a quarter of an inch in length, and it is further characterized by producing its flowers mostly singly from each group of buds instead of a number of flowers in a sort of cluster, as in C. arborescens. It is not such a showy, and, therefore, not such a desirable shrub for general cultivation. It blossoms later than C. arborescens, however, and has a value in keeping up the succession of bloom. Among the plants which seem more nearly allied to this are specimens received under the names of the Sand Caragana, or C. arborescens arenaria and C. microphylla.

Caragana frutescens is a distinct species of slender habit, and having two pair of small obovate wedge-shaped leaflets crowded at the apex of each short leaf-stalk. Usually one, and not more than two, flowers are produced from each bud. They are small, little over half an inch long, of a deep yellow color, and with the terminal end of the standard resupinate, or well turned up and backward. As it grows here it does not appear to be such a profuse bloomer as C. arborescens. It is a much smaller and more slender plant, with darker green foliage, which better sets off its blossoms.

Caragana grandiflora seems to be a distinct species, having four large dark green leaflets at the tip of each leaf-stalk and with much larger flowers and stronger habit than C. frutescens. If the blossoms were produced in greater abundance it would be the handsomest of all the species which are hardy here. So far the solitary pediceled flowers seem somewhat scattered as they appear in this vicinity.

Caragana Chamlagu, a Chinese species, having large flowers, fully an inch long, of a yellow color, changing to reddish after full expansion, is an interesting plant, although it has not proved so vigorous or hardy here as most others. Its leaves are composed of four large shiny leaflets on spiny-pointed leaf-stalks. The branches assume a drooping habit as they grow old.

Another drooping and very slender-branched species is C. pygmæa, which is sometimes grafted on tall stems of C. arborescens for the drooping effect. On its own roots it is not likely to grow more than two or three feet high. Its leaflets are linear-obovate in shape and crowded in fours at the base of very short spiny-tipped petioles. The very small foliage allows full exposure for the bright yellow flowers, which are of good size but not very abundant. It blossoms in the season of the Laburnum.

It is characteristic of Caraganas that they bear a pair of more or less developed spiny stipules at the base of each leaf-stalk, and the tip of each leaf-stalk or rhacis ends in a sharp spine. In some species these leaf-stalks fall with the leaflets, but in others they persist for a year or more longer and give the plants quite a formidable appearance. They persist on C. frutescens, but are not conspicuous, and they also remain on C. Chamlagu. On C. spinosa, however, they are from an inch to an inch and a half long, slender and needle-like, fairly woody and rigid, and capable of inflicting ugly pricks and deterring small animals from passing among them. The branches of C. spinosa are long and numerous, and interwoven they form an impenetrable low hedge. The plant will grow four or five feet high under cultivation. Its small leaves and buds are covered with short soft gray pubescence, which gives the whole plant a hoary or grayish aspect. The flowers are large, yellow and solitary. While it does not appear to be a profuse bloomer, the plant is worth cultivating, on account of its curious appearance, in every garden where vegetable oddities are desired; and there are many situations where its value as a low hedge would seem obvious. It is likely to grow on dry or sandy soils where some other hedge-plants would be a failure.

Arnold Arboretum. *J. G. Jack.*

Some California Raisin Grapes.

LEADING California growers are experimenting with seedling Raisin Grapes, and, although they vary greatly, some seedlings of promise are already beginning to bear. A larger seedless Grape is desirable and is quite likely to be obtained. There are now two types of the Muscat Grape grown for raisins in California. The type preferred in southern California is the true Muscat of Alexandria; this is the variety most esteemed for this purpose in Valencia and Smyrna. The large, firm berry is egg-shaped, smaller at the stem-end, and when cured and packed this Muscat looks a little smaller than Muscatels of the same grade. The Muscatel, or Gordo blanco Grape, while similar in general appearance to the Muscat of Alexandria, is distinct in habit of growth, style of cluster and form of fruit. The vine spreads, but more evenly, without the upright cane so often seen in the Muscat; the clusters are more compact and the berry is rounder, being a short oval. This is more nearly the type of the best raisin grapes of the Malaga district, and is the favorite raisin grape of the San Joaquin valley. A third type of the Muscat class, though not yet grown to any extent, is the Huasco, of Chili. This is said to be a seedling of the Muscat of Alexandria, and produces, in its native country, a very fine and high-priced raisin. As tried in California it does not maintain its local reputation. Vines have been sent to distinguished ampelographers of Europe,

who are inclined to doubt the distinctness of the Huasco, but all authorities agree respecting the unique excellence of the Huasco raisin. There is, therefore, a wide field for investigation here.

The White Malaga makes a raisin of fair quality that ships better in bulk than the Muscat raisins; being gathered at one crop it is preferred by growers in districts subject to early rains. Still more interesting, because only recently used as a raisin grape, is the Feher Szagos, a large greenish amber Sherry-wine grape of Hungary. This notable "White Jack," which the name means, has been grown for thirty years or more in California, but only recently as a raisin grape.

Seedless Sultana represents a very different class from the preceding varieties. It must be pruned long, and then bears enormous crops. The round and seedless berries are an amber-yellow when ripe, with perhaps a brownish tinge in the sun. The yield of grapes has been sixteen tons to the acre, in suitable localties. The raisin made from this grape is slightly, but agreeably, acid. It needs long, warm summers to ripen well.

Another group of seedless grapes, the true Currant Grape type, comes, like the Sultana, from the Grecian isles and the shores of Asia Minor. The Black Currant Grape has small berries, black and seedless, and a peculiar, rich aroma. The white and the red varieties, though desirable and free bearers, are less valuable for currants. The black variety has not yet been planted to any great extent in California, as the proper locality for it has not yet been discovered.

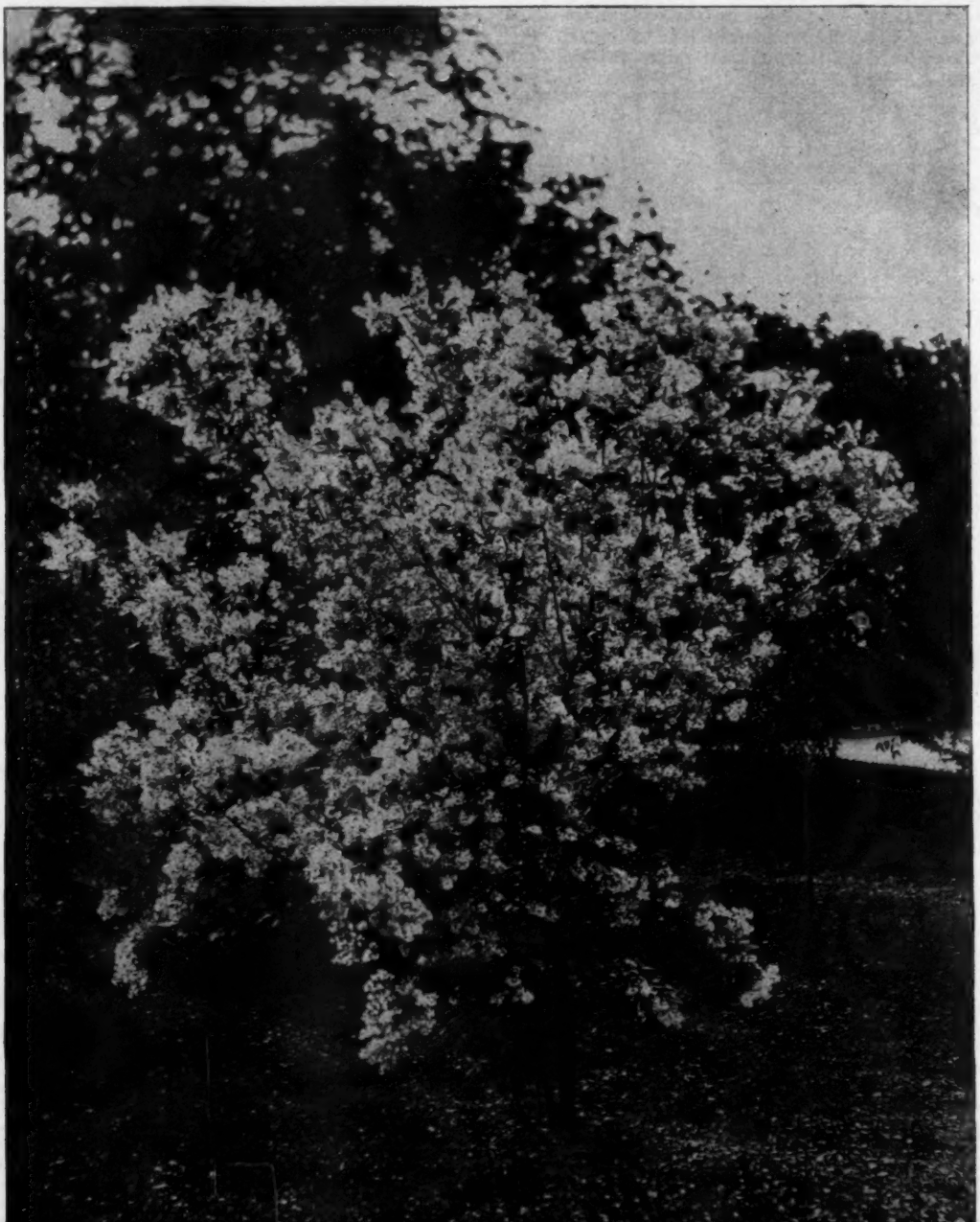

Fig. 39.—Syringa pubescens in a Massachusetts garden.—See page 264.

Thompson's Seedless Grape is one of the most popular of all the raisin varieties and presents an interesting problem to the horticulturist. It is not known whether it is a new variety or not. It appeared in a vineyard near Yuba City, Sutter County, and was extensively propagated as a seedling. Upon investigation, a horticultural committee reported that the parent vine was thought to have come in a shipment received from Ellwanger & Barry, of Rochester, in 1872. The name given was Lady de Coverly, and the Grape was said to be of Turkish origin. Messrs. Ellwanger & Barry stated, upon inquiry, that no such Grape was in their catalogue, nor had been grown by them. I have examined Count di Rovasenda's great book on *Ampelography* (1887 edition), also Monsieur Pulliat's works, and cannot find any such name or synonym, nor any Grape that corresponds to the Thompson Seedless. Like the California Zinfandel, and the old Grape of the Spanish Missions, Thompson's Seedless appears to be unknown in Europe. Perhaps as our importations of Grapes from Asia Minor continue we shall find the original of it. Mr. Eisen, in his book on *The Raisin Industry*, suggests Damascus as the probable home of the type.

This grape is perfectly seedless, and very popular for culinary purposes. It is larger than the Seedless Sultana, and the raisins it produces are of better quality and sweeter. One pound of raisins is usually made from 3.27 pounds of ripe grapes. The oval, greenish yellow berries are produced in enormous clusters that fairly cover the canes. Long pruning is essential. This variety, now more largely planted than any other sort, was poor for years under the ordinary short pruning given to Muscats and Malagas. Mr. J. P. Onstott, of Yuba City, lately reported the yield of groups of vines of this variety in his vineyard. In 1888, nine vines averaged eighty-nine pounds apiece; the same vines, pruned short, yielded thirty pounds a piece. Five vines in 1891 produced 516 pounds. Six two-year-old vines, still in nursery-rows, standing eight feet apart each way, produced an average of forty and a half pounds apiece. One vine yielded fifty pounds in 1885, sixty-eight pounds in 1886, seventy pounds in 1887, and 109 pounds in 1888. Then it was pruned short, and the yield of 1889 was only fifteen pounds. The next year, 1890, it was still suffering, and without bearing wood, and only bore twenty-four pounds. In 1891, being fully recovered, the crop of this vine was 147 pounds. It should be noted that all the vines tested stood in a vineyard, and were eight feet apart each way.

As I have said, this new Grape of unknown parentage presents many valuable features, and is planted largely both for raisins and table use. The fact that a change in the method of pruning caused its good qualities to be recognized, seems to me worthy of especial note. Practically speaking, the variety was picked up in a long-neglected vineyard, and has become famous under the treatment of an intelligent vigneron.

Berkeley, Cal. *Charles Howard Shinn.*

Notes from Baden-Baden.

IRIS TECTORUM, Maxim., and I. tomiolopha, Hance, are synonyms, but the latter has larger and deeper-colored flowers. I. Cypriana is a highly developed form of I. pallida; its very large sweetly scented flowers are pale sky-blue and very attractive. I. maridensis, also, is a beautiful species, much like the former, but having a tinge of purple and being strongly veined. I. Germanica macrantha, lately introduced by me, is the largest Iris under cultivation; harmonious shades of bright blue and deep violet in its flowers make it a striking subject. It came from Persia with I. Meda, which has charming bronzy yellow flowers. I. bosniacæ is another splendid novelty; it flowers very early, and the large deep sulphur-colored blooms are very showy.

Incarvillea Delavayi, an introduction of the Museum Garden at Paris from the Chinese Himalayas, is a plant of great beauty; pinnate, stout, deep green leaves, about a foot in height, are overtopped by a strong stalk with five or six large, Bignonia-like, deep bright purplish rose flowers. Sobolewskya clavata is a hardy Crucifer, having small pure white flowers on much-branched stems about two feet high; the quantity of flowers, produced in greatest freedom at once and during four weeks, gives to this the stamp of a very desirable perennial. Accidentally a white variety of Linaria cymbalaria has appeared, and looks very pretty and distinct. Monarda discedens is another novelty, which, though not very showy, will find, nevertheless, many admirers; its bells are pure white. The hardy Tropæolum Leichtlinii shows long wreaths of glaucous gray foliage, interspersed with hundreds of large orange-yellow flowers. Verbascum pannosum from south Bulgaria, introduced last year, stood the severe weather of the past winter and is a very decorative plant. Its thick, very large leaves, covered with a silvery white tomentum, produce a large spike of sulphur-yellow flowers. Planted singly on a lawn it is very effective. Among my latest introductions, Tchichatscheffia isatidea takes foremost rank. The plant is a native of Asia Minor and has been named by Boissier in honor of the celebrated Russian naturalist and exploring traveler. From a tuft of hairy spathulate dark green leaves arises a stalk as thick as a man's finger, carrying a thyrsus composed of thousands of flowers which is a foot across. It appears as if a bunch of bright-colored Syringa flowers had been inarched on a herbaceous plant. It is in beauty for four weeks and has a vanilla fragrance. It must be classed as one of the most distinct, remarkable and beautiful of rock plants.

Baden-Baden. *Max Leichtlin.*

Plants hardy in Vermont.

AN ordinary winter in Vermont is sufficiently severe to test the hardiness of plants, but the winter of 1892-93 was in this section of the state exceptionally trying, and any species that could survive such severe frost may well be considered perfectly hardy. The heavy snow-storms which usually precede our coldest weather did not reach this section until the ground had frozen in many places four feet deep. What in ordinary winters would be ample protection from frost, was of little use in these unusual conditions.

I was surprised to see so few of the California bulbs injured. Lilium Parryi came up in fine condition, and Fritillaria pudica and F. atropurpurea are both strong and healthy. Indeed, I never saw finer flowers nor larger and fuller capsules of seed on F. pudica than this year. F. liliacina and F. biflora, though not so strong as the others, are doing well, while close at hand, with the same treatment, F. lanceolata was killed. Erythronium grandiflorum and E. Smithii have never flowered better. They have now full capsules of seed such as I have never before seen on them in this state.

Zygadenus paniculatus and Camassia esculenta have flowered freely. Brodiæa capitata, B. grandiflora and B. ixioides are budded for bloom; also B. laxa and B. multiflora. Ipomœa pandurata and I. Mexicana, two perennial Morning-glories growing near each other, were covered with three inches of hay during the winter. I. pandurata came through without injury, but I. Mexicana was killed. A fine clump of Montbretia crocosmiæflora was planted deep and protected with special care, but was entirely killed. Quite a number of Lilies with but slight covering appear not to have been injured at all.

Among the first bulbs to flower were Fritillaria pudica and F. atropurpurea. Both are well worth growing, but the nodding golden-yellow flower of F. pudica is the prettier. Erythronium grandiflorum and its variety, Smithii, Adder Tongues, or Dog's-tooth Violets, from California, are early bloomers. We have a fine variety of color in the several American species of Erythroniums, counting in those from the Pacific coast, and our more common eastern E. Americanum. The white-flowered E. albidum, from the western states, is more difficult to grow satisfactorily, because of its tendency in cultivation to divide up. In a bed of five hundred, set out several years ago, only a few flowers were ever produced, yet the plants seem to have increased, and are as strong as ever, except that they do not bloom. There is a Texas variety known as Coloratum, which is quite hardy, a free bloomer, and, unlike the typical plant, not inclined to exhaust itself by offsets. These various species of American Dog's-tooth Violets deserve more attention from cultivators. They seem to be fairly hardy and require little care when planted at the proper time—in August and September—and they bloom early, at the time when flowers are most appreciated.

Charlotte, Vt. *F. H. Horsford.*

Plants in Flower.

IN the hot sunny days the Spanish Irises have quickly faded, but, as usual, the first of the English Irises follow in close succession, and with another form of beauty will bridge the season till the Japanese forms show their quaint markings. In the mean time there are other more or less well-known kinds now in flower. I. orientalis of Miller, or I. ochroleuca, as generally known, is one of the most distinct, stately and beautiful of the genus. The sword-shaped leaves are about an inch broad and three feet high. The flowers are large, with rather narrow petals of the purest white, with yellow markings. This Iris seems to appreciate a fair supply of moisture at the roots. An Iris which I grow as I. gigantea belongs to the same group,

and has slaty white flowers, not nearly so effective, while the habit is the same. I. Monnieri is a fine yellow form of the same group, which is a good companion to I. ochroleuca. I. Caroliniana, now in flower, is a favorite for its distinctness. It has very light purple flowers, veined on the falls with white and yellow markings and brown stems. The leaves are sword-shaped and somewhat large. I. cuprea deserves mention for its quaintly colored dull coppery flowers. I. pseudo-acorus and several of the Spuria group are also in flower, but call for no remark.

Mr. Cameron's note on the culture of the beautiful little I. cristata interested me, as it grows with me under exactly opposite conditions from those noted by him. In a raised dry border of sandy loam, fully exposed to the sun, it thrives perfectly. It has been there three seasons, I believe. It is evidently a plant of an accommodating habit, but with a neighbor of mine it fails continually in a sandy loam. At the same place, I. verna, a plant which constantly disappears with me, grows like a weed.

The Brodiæas are at present very attractive. B. coccinea, the quaintest, has dark red tubular flowers, tipped with green, in clusters. B. laxa is the showiest of the purple kinds, with umbels of upright bell-shaped flowers, somewhat Agapanthus-like in effect. On B. congesta the flowers are borne closely. B. Minor is a gem; unlike the other species, which have stems over a foot long, the plant carries its deep bright star-like purple flowers only a few inches high. B. lactea has large umbels of pure white flowers, with green bands. The flowers have short petals and are somewhat cup-shaped. The first leaves of this plant are twice the width of the later ones. These bulbs have wintered without protection in a moist, heavy border without losses.

There are few prettier hardy plants in foliage and flower than the Pyrethrums, or the colored Daisies, as they are aptly termed. The finely-cut foliage looks delicate, but the plants are perfectly hardy. A packet of seed will usually give one a good assortment of colors, ranging from the faintest pink to a bright carmine. Some of them show the disagreeable bluish red, but these can be discarded. I prefer the single ones about the size of the Daisy, as most useful for cutting. The Anemone-like double forms ornament the border and are striking flowers in a way, but are rather formal for bouquets. This reminds me that Galium aristatum is now in flower. This is the earliest of the fine mist-like flowers, so indispensable for floral arrangements. The plant is of a rather weedy habit, but furnishes a great amount of useful sprays to arrange with bolder flowers.

Elizabeth, N. J. *J. N. Gerard.*

Correspondence.

The Wild Garden.

To the Editor of Garden and Forest:

Sir,—This is the season for replenishing the wild garden. Only a few plants can be transplanted safely during the flowering season, which comes in April or May for most of the desirable species, and after midsummer many of them, especially the bulbous species, have disappeared for the year. It is very interesting to gather a large sod or ball of soil with a plant, for that not only insures its safe removal, but there is prospect of securing something else along with it. I have obtained several prizes in that way, among them Monarda didyma (Bee Balm) and Thalictrum Cornuti (Meadow Rue).

Wild plants may be cultivated or not, as a rule, just as one chooses. They must be looked after, if they have been gathered without previous knowledge of their habits, for some will turn out to be rampant growers and destroy the others. The large leaves of the Bloodroot, the running habits of some Asters and Lysimachias, or the spreading in a mass of Phlox subulata are examples. Wild plants that have taken to the woods have not always done so from choice. They are merely such as will not thrive in sod, or are unable to make headway against it. Phlox subulata remains in the open, for it forms its own sod and holds its ground, while Phlox divaricata hardly forms a sod and is found in open woods. Flowering late in spring, it cannot endure heavy shade, and is thus restricted to groves.

I find this delicate Phlox, and also the Monardas, both M. didyma and the less striking M. fistulosa, far from hardy in the wild garden. They winter-kill in spite of every care. The old favorite, Aquilegia Canadensis, or wild Red Honeysuckle, as it is improperly called, often degenerates in cultivation, and there are not a few perennial plants of especial desirability that appear to depend largely on seed for perpetuation. For this reason it is quite desirable to preserve the natural surroundings of wild plants, and these are not shade so much as absence of sod. If the soil is light, to begin with, all they will need is a mulch of leaves sufficient to keep down grass. A spreading tree adds to the desirability of the location, as the late-flowering sorts can be planted on the south side of the plot.

There are many pleasant surprises in the gathering of plants for a wild garden, which should be carried on every year. In searching for specimens every plant that piques the curiosity should be taken, if size permits. In my experience, a tuft of light green leaves developed into Teasels, whose seedling appearance I had forgotten, and the graceful Thalictrum dioicum was secured unnoticed. The numerous species of Violets, from the minute, white, fragrant V. blanda to the stemmed species, should be gathered entire.

In reading articles that undertake to enumerate plants desirable for a wild garden, one is always disappointed that so few are mentioned and so many favorites are left out. It is, therefore, best to take the rational as well as educational plan of choosing all accessible plants that appear available, whether they are known or not. The process of becoming acquainted will be very valuable. We really know little of the possibilities or limitations of a species till we have it under daily observation. The Trilliums, for instance, multiply rapidly in semi-cultivation, but the Daisy with me is no longer a rampant weed, as its flowers are fairly devoured by an insect resembling the pea bug.

Buffalo, N. Y. *John Chamberlain.*

The Kumquat Orange in Florida.

To the Editor of Garden and Forest:

Sir,—I observed in a late number of Garden and Forest that the so-called Kumquat orange has been sold in New York under the name of Too-kin-kan. I have had this fruit under cultivation for about ten years. It came to us from China, by way of California, and, I think, fruited on my farm among the first places in this state. I exhibited the fruit and the trees in fruit, planted in tubs, at the Sub-tropical Exposition in Jacksonville in 1885 or 1886.

At that time the fruit was known by but few persons in Florida, but, believing it worthy of cultivation, I planted fifty or more trees. The tree is dwarfish in habit, usually six to eight feet high, though one tree, budded ten years ago, is ten feet high, with a spread of ten feet, and bore 8,000 fruits during the season just past.

All the fruit we have raised has sold readily at home and in Jacksonville and St. Augustine. The retail price in these cities has been fifty to seventy-five cents a dozen. We have trees of the globe-shaped variety, but these have not yet fruited. The Chinese name which we have received for the oblong variety is Too-kin-kan, and for the globe-shaped variety Kin-kan. In China the preserved fruit is called Kumquat, and this name was commonly given to the fruit after the preserve was brought to this country and Europe by sea-captains.

We have preserved the fruit whole and made jelly and marmalade of it, with excellent results, and have shipped quite a number of trees to all parts of the United States, and some to Canada. The trees in fruit are very beautiful. During last season one tree produced 800 oranges, and the whole top could have been enclosed by a two-bushel basket without crowding the limbs or disturbing the fruit. We use sour Orange stock for budding, and give the same cultivation that we give to Orange-trees.

Ormond-on-the-Halifax, Fla. *C. A. Bacon.*

The Virgilia.

To the Editor of Garden and Forest:

Sir,—The Yellow-wood, or Virgilia-trees (Cladrastis lutea), are flowering profusely in this neighborhood this year. Last year the trees here produced no flowers at all. It would be interesting to know if the cultivated trees in other parts of the country have this habit of blooming only on alternate years, and, if this is their usual habit, whether this is the year for all parts of the country to flower. Possibly some of your correspondents may be able to throw some light upon this subject.

If any of your readers do not know this delightful tree they should make its acquaintance. The forests of America do not contain a more desirable tree for the decoration of a lawn or garden. Although exclusively a southern tree, and one of the rarest and most loved of all trees, it is perfectly hardy as far north as Canada; it grows rapidly; it is free of insects, and

perfectly clean, with foliage of a charming color, a graceful habit, beautiful and abundant flowers and bright autumn coloring. The liability of its branches to break, owing to their brittleness, is the only weak point of the Virgilia in this climate. Are there many other trees of which so much good can be spoken, or against which so few charges can be substantiated?

Boston, Mass. *F. S.*

New Anthuriums.

To the Editor of GARDEN AND FOREST:

Sir,—Anthurium Goldringi is a new hybrid which comes from crossing A. Andreanum and A. Scherzerianum. The leaves are from six to eight inches long and two inches wide at the base, acutely cordate, with irregular undulated margins. The spathe is two inches wide by three long, heart-shaped, flat, with a tail-like apex, and bright scarlet in color. The spadix is straight, erect, pure white, and changes with age to yellow. The name has been given in compliment to F. Goldring, of Slingerland, New York. A. Hollandi is another hybrid which is intermediate between A. grande and A. Ferrierense. The cordate leaves are a velvety green, with paler neuration; spathe, broad, irregular, and reflexing with age; color, deep rose-pink; spadix, waxy white and erect. It is named for Rev. Dr. W. J. Holland, Ph.D., of Pittsburgh, Pennsylvania.

Orange, N. J. *Robert M. Grey.*

The Columbian Exposition.

Green Vegetables.

FRESH vegetables are very scarce here, but Canada has a remarkably large and representative exhibit of stored products. New vegetables—those grown in 1893—are strangely missing from the fair. One reason for this is, perhaps, the comparatively small place and importance attached to vegetables in the original schedules or system of classification, and the fact that the southern states, from which the early vegetables are to be expected, have shown very little interest in the horticultural displays. Again, there is always a general indifference to the merits of vegetables as exhibitive products. It is a common and unfortunate opinion that kitchen-garden plants are proper for late summer or fall exhibitions only, although no horticultural display is capable of arousing greater interest than a neat and crisp collection of early vegetables, beginning with forced tomatoes, lettuce and radishes. The only attempt which has so far been made at Jackson Park to show these early vegetables was a consignment of forty-one varieties of the choicest Long Island products collected for George T. Powell, who has charge of the horticultural interests of New York, by a dealer in New York city. But these were all lost through unnecessary delays in passing them into the grounds at Chicago, due to the obstructive rules of the Exposition, or, more properly, of the Bureau of Transportation. The Exposition has suffered considerably in its displays of early and perishable products from this cause, but assurances have now been given that the obstructions will be removed.

While many states are planning to make large displays of vegetables later in the year, only New York, so far as I can learn, intends to make any considerable efforts toward a continuous show of perishable vegetables throughout the season. A second consignment of vegetables from New York city is expected soon, and, thereafter, the State Experiment Station at Geneva will supply the tables throughout the season. This station received a special grant from the state legislature for the purpose of growing these vegetables. At the present writing no new vegetables have been shown except a few tomatoes, from Florida—which are now gone—and a very little green stuff from New York state.

In stored vegetables Canada makes the only noteworthy exhibit. This Canadian show is remarkable because of the great territory concerned, contributions coming from Assiniboia and Manitoba to Prince Edward Island. These exhibits are made under the auspices of the provinces of Ontario, Quebec, Prince Edward Island, the Experiment Station and the Department of Indian Affairs. These vegetables have been kept in cold storage, and include such things as potatoes, beets, carrots and turnips. The display is really a very large one and is well disposed upon a series of rising shelves in the north end of the Horticultural Building. Ontario shows 182 plates and eighty-six varieties of potatoes, twenty-two varieties of turnips, all the leading field and table carrots, table beets in variety, sugar beets, mangels, extra good winter radishes, parsnips and onions. In all the potato exhibits the predominance of varieties of more recent introduction than the Early Rose is noticeable, showing that the commercial life of varieties of potatoes is not of long duration. In the opinion of M. C. Swanson, who is in immediate charge of the Canadian vegetable displays, the leading potatoes in Ontario now are Early Puritan, for early, with the main crops devoted to Beauty of Hebron, White Elephant, Late Rose and Empire State. Prince Edward Island shows but eight varieties of potatoes, sixteen other kinds, which were shipped for exhibition, having been accidentally lost. Here the Empire State seems to be the leading variety. This province shows of carrots six varieties, of turnips four, of beets three, with mangels, parsnips and kohl-rabi. Quebec lost much of its exhibit, but now has five varieties of potatoes, three of carrots, two of turnips and one of parsnips.

The experiment station displays for Canada fall under four general heads—the show of the Central Experimental Farm at Ottawa, and of the branch stations at Nappan, in Nova Scotia; Brandon, in Manitoba, and Indian Head, in Assiniboia. The exhibits from the branch stations—at least from Nappan and Indian Head—are collected from various farmers as well as from the experiment farms themselves. The Central Experimental Farm now has on exhibition fourteen named varieties of potatoes and seventy-six unnamed seedlings, the latter being unusually promising; also several varieties of carrots, onions, beets, mangels and parsnips. From Brandon, Manitoba, there are twenty-nine sorts of potatoes, with other roots. Very striking potatoes in this exhibit are two local seedlings—Village Blacksmith, a medium-sized, white, very scaly tuber, and Rock, a very firm white variety. These are judged to be valuable potatoes for Manitoba. The displays from the Northwest Territory (Assiniboia) are an astonishment to most observers. The products are shown in great variety, and they are usually very large. A tuber of the Man potato on exhibition weighs four and a quarter pounds. This and other varieties exhibit the same tendency to large size which is shown in tubers from Idaho and other parts of our north-west. From the station at Indian Head alone there are seventy varieties of potatoes, while no less than ten other villages are well represented in potatoes and roots. Indian Head has a large collection of turnips, beets, carrots, with kohl-rabi and other vegetables. It was a happy and most effective thought on the part of the Canadians to show these excellent products of its almost boundless north-western territory.

Nova Scotia and New Brunswick are represented by collections made by the Experimental Farm at Nappan. Nova Scotia has eight varieties of potatoes, three each of turnips, beets and carrots, with some mangels. New Brunswick is represented by products obtained from its farmers, in twenty-one varieties of potatoes, with onions and various roots.

One of the most interesting of the Canadian displays is a collection from the Department of Indian Affairs, showing ten varieties of potatoes, various carrots, turnips, onions from seeds, tops and potato-onions, and mangels grown by Indians in reservations in Ontario. Some of them were grown chiefs. Six hundred pounds of vegetables were contributed by these Indians; and there are also a dozen varieties of apples of their raising shown in the Ontario fruit-exhibit.

Altogether, the visitor is impressed with the adaptability of the Canadian provinces to the growing of potatoes and roots, both for human food and for the support of animals.

Other vegetables in the Horticultural Building are six varieties of potatoes, and a few of sweet-potatoes from New Jersey, and some large potatoes from Idaho and Oregon. In the Agricultural Building, at the opposite side of the park, are a good collection of twelve kinds of potatoes from Quebec, Burbank potatoes from Oregon, a small collection of potatoes and roots from W. O. Bush, of Thurston County, Washington, and a few things from California. The California products are shown in greater extent in the California State Building. These Californian exhibits comprise a few potatoes, beans, sweet-potatoes, enormous mangels, corn in ear, small dried peppers in cases with glass covers, and various squashes and gourds. The Hubbard Squashes, from Orange and Los Angeles Counties, have scarcely a characteristic mark of eastern specimens, save the color. They are very irregular and knobby in shape, and weigh from seventy-five to eighty-one pounds. The Lagenaria gourds are shown in various forms, some of the slender varieties reaching over four feet. Washington has a display in its state building of potatoes, turnips, carrots, parsnips and onions, all remarkable for large size. Palouse Seedling, a local potato, which is thought to have unusual merit, averages about one and one-fourth pounds to the tuber. West of the mountains, Early Rose is said to be the leading variety in Washington; but eastward, some of the best sorts are those now on exhibition, Dakota Red Palouse Seedling, Snowflake, Polaris and White Burbank.

Chicago, Ill. *L. H. Bailey.*

Notes.

Harper's Magazine for July will contain an illustrated article by Mr. Charles A. Platt on the "Formal Gardens of Italy."

Mr. E. S. Carman states that, after a full trial, the Palmetto Asparagus, which is said to be a new variety, is not different in any respects that he can discover from the old Conover's Colossal.

Perhaps cut-flowers of the yellow Sweet Sultan have often been on sale in this city, but we never chanced to see any until a fortnight ago, when we observed in some florists' windows very well-grown flowers of what seems to be a good strain of Centaurea suaveolens. The flowers are large and full, of clear Dandelion-yellow, with good stiff stems, and they last a long time. This is by no means a new flower, but that it is comparatively rare in cultivation is proved by the admiration and surprise expressed by many persons whose attention has been called to them.

The Laburnums have been flowering well this year, and the long pendulous racemes of yellow flowers even on small plants well justify the common name of Golden Chain, which is given to this tree. Laburnums hardly deserve their reputation for being tender. They flourish much better, however, in a dry soil than in a damp situation, where the stems are liable to be killed in winter. They thrive in partial shade and on the edge of woods, and they do better on the north side of a group of other trees where they are not exposed to the rays of the sun in midwinter. They are short-lived, but so beautiful that they deserve all the extra care required to meet their wants.

A writer in a late number of the *American Florist* very truly says that many Roses that have been discarded as useless because they fail to grow indoors, are really admirable bedding plants. Wootton seems to succeed very well out-of-doors, and, indeed, it can no longer be called a failure as a forcing Rose. Madame Pernet Ducher, one of last year's introductions, is a good bedding Rose, with pale yellow buds turning to pure white as the flower opens. Triomphe de Pernet also does well, and Marion Dingee is among the best of crimson bedders. The old Bourbon Hermosa and the Polyantha Clothilde Soupert are among the best for constant outdoor blooming, and they have the advantage of being hardy. Madame Elie Lambert, which is classed as a pure Tea, survived the winter last year out-of-doors near Philadelphia, while hybrids were dying all about it. This is an excellent bedding Rose, creamy white or flesh-color, and a very finished flower.

In a bulletin of the Washington Experiment Station, Professor Lake states that on examining a quantity of Apple-seedlings for grafting, he observed that a large part of them had twisted and knotted roots, some slightly abnormal, some altogether monstrous. Closer examination showed multitudes of little excrescences from the size of a pin-head up to that of a filbert, which were evidently the work of the woolly aphis. Last spring, when planting yearling Apple-trees purchased in the eastern states, the same tell-tale warts were found on several trees. In the north-west this woolly aphis is a most serious pest, being an insidious foe that creeps into the orchard and does its first and most lasting work under cover of earth and in darkness; that is, it makes its appearance generally on the roots of young trees, especially when they are in old nursery-ground. Undoubtedly the pest is disseminated very largely on the roots of young Apple-trees.

Among the specialties in the fancy fruit markets last week were greenhouse figs, from New Jersey, of excellent quality and delicious flavor, which sold at a dollar a dozen. Mammee apples, from the West Indies, of doubtful satisfaction to a civilized taste, sold in small quantities to venturesome buyers at twenty cents apiece. The true plantain, which is quite distinct from the banana and is only used for cooking, is rarely found in the New York market. Large fruit of good quality was offered at fifty to seventy-five cents a dozen. Muskmelons, from Florida, are as low as fifteen cents apiece, and watermelons from thirty cents upward. Strawberries are less plentiful than when the southern supply was at its height, the dry weather in this section, from which the fruit now comes, having shortened the crop. Choice strawberries of mammoth size are thirty-five cents a quart; selected berries eighteen cents, and average berries ten to fifteen cents. Green corn from the south is sixty cents a dozen ears.

Varieties and hybrids of Helianthemum vulgare, the true Rock Rose, have attractive flowers, which range in color from white through shades of red and yellow. At the Arnold Arboretum these plants make a low shrubby growth, spreading over the ground in a dense mat of foliage, on which the flowers are now appearing. The separate flowers do not last long, but they keep opening all summer, and Mr. Dawson, the propagator at the Arboretum, thinks a great deal of them. Last week Ceanothus ovatus was also in bloom, although the commoner species, well known as New Jersey Tea, had not begun to show any flowers. This species is rare in the east, although it is common in the west and south-west. It is a low shrub, some two or three feet high, and its compact habit, good foliage and handsome white flowers, which come after most of the spring shrubs have flowered, make it very useful, although it is rarely seen in cultivation. Another rarely cultivated plant in flower is Vaccinium stamineum, the Squaw Huckleberry, a low-branching shrub, which is now covered with its graceful, campanulate, greenish white flowers.

In a bulletin of the Division of Entomology some experiments in planting Sweet Clover (Melilotus alba) for honey are given in detail. The experiments were made at the Michigan Agricultural College, where three acres of Sweet Clover were sown, which began to bloom on the 8th of July and continued in flower until the 20th of September. The crop made a rank growth with abundance of flowers, and yet, while it was in full bloom and the bees were continually busy on it, with all other natural sources of nectar absent, no appreciable amount of honey was gathered, and the hive lost weight. This is a repetition of former experience, and Mr. Larrabee, in charge of the work, states that no results have been obtained with any plants sown or planted for honey that would warrant a bee-keeper in expending money and labor in this direction. His advice to keepers is to cease efforts of this sort and turn their attention more persistently to extending the area of wild honey-producing plants, and he urges upon them the superiority of Alsike Clover and Japanse Buckwheat as farm crops, and the Linden as a shade-tree.

In a recent number of the *American Agriculturist* it is stated that a large percentage of the garden-seeds now used in the United States are grown in Santa Clara County, California, where this industry was begun in a small way fifteen years ago. The climate there is peculiarly favorable for this work, as rain seldom falls during the summer months, when seeds are being harvested and stored. Onion-seeds are raised in large quantities, four growers in the Santa Clara Valley having this season planted 1,200 acres. The onions used for producing seeds are grown from seed the previous year. After having been harvested in the autumn they are usually left in sacks in the field until they are set out in January and February. The soil is low, moist and fertile, and no irrigation is needed, as there is where onions are raised from seed, since the winter and spring rains provide sufficient moisture for the crop. The seed is harvested in August. As much as 500 pounds are obtained from an acre, a short crop reaching not more than half that quantity. According to the supply and demand, sixty cents, and even a dollar, a pound is obtained. From forty to sixty sacks of onions, containing nearly a hundred pounds each, are required to plant an acre.

Bulletin No. 33, from the South Dakota Experiment Station, is devoted to some plants injurious to stock. It includes a description of four species of Astragalus, together with Oxytropis Lamberti, all leguminous plants and all classed as Loco-weeds. The descriptions and plates of these weeds are given to help stock-raisers in recognizing them, and the methods of destroying them are also given, together with some notes on the treatment of the diseases which they are supposed to produce. Besides these Loco-weeds, there is an elaborate note on the Rattlebox (Crotalaria sagittalis), which is said to cause the disease among horses known as Crotalism. Since this last weed grows to a greater or less extent throughout most of the United States east of the Missouri valley, it is remarkable that the disease which it is said to engender is confined to the west. It should be said, however, that the plant is very abundant in the bottom-lands of the Missouri River, and is exceedingly common in the hay cut there. In South Dakota, the Wheat Grasses (Agropyrum species) and the Wild Ryes (Elymus) are subject to the disease known as ergot, and the fungus which causes it (Claviceps purpurea) attacks also the Blue Joint Grass, Reed Canary Grass, Kentucky Blue Grass, Canada Blue Grass, and of course common cultivated Rye. In other states, Red Top and Timothy are occasionally affected by it. Domestic animals fed on plants affected by ergot contract the disease known as ergotism, and the advice given in the bulletin is to cut the grasses liable to attacks of this fungus early, for since the ergot is formed late in the summer or in the fall early cut hay will not be infected.